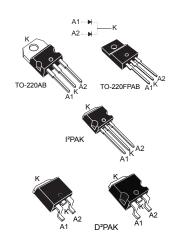


Datasheet

Power Schottky rectifier



Features

- High junction temperature capability
- · Avalanche capability specified
- Insulated package: TO-220FPAB
 - Insulating voltage = 2000 VRMS sine
- ECOPACK[®]2 compliant component for D²PAK, I²PAK, TO-220AB and TO-220FPAB on demand

Description

This device is a dual Schottky rectifier suited for high frequency switch mode power supply.

Available in TO-220AB, TO-220FPAB, I^2 PAK and D^2 PAK, this device is intended to be used in LCD screens or adaptors providing such applications with good efficiency at both low and high load.

Product status				
STPS20LCD80C				
Product summary				
I _{F(AV)} 2 x 10 A				
V _{RRM}	80 V			
T _j (max)	175 °C			
V _F (typ)	0.66 V			

lectronics sales office



1 Characteristics

Table 1. Absolute ratings (limiting values, per diode, at T_{amb} 25 °C, unless otherwise stated)

Symbol	Parameter						Unit
V _{RRM}	Repetitive peak reverse voltage	Repetitive peak reverse voltage					
I _{F(RMS)}	Forward rms current					30	Α
				T _C = 145 °C	Per diode	10	
	Average forward current δ = 0.5, square	re	TO-220AB,D ² PAK, I ² PAK	T _C = 140 °C	Per device	20	
I _{F(AV)}	wave		TO-220FPAB	T _C = 120 °C	Per diode	10	A
				T _C = 85 °C	Per device	20	
I _{FSM}	Surge non repetitive forward current	t _p =	10 ms sinusoidal			150	Α
P _{ARM}	Repetitive peak avalanche power $t_p = 10 \mu s$, $T_j = 125 °C$				230	W	
T _{stg}	Storage temperature range					-65 to + 175	°C
Tj	Maximum operating junction temperature (1)			+ 175	°C		

^{1.} $(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.

Table 2. Thermal parameter

Symbol		Parameter				
		TO-220AB, D ² PAK, I ² PAK	Per diode	3.20	°C/W	
Du a	R _{th(j-c)} Junction to case	TO-220FPAB	Fei diode	6.10		
Txtn(j-c)		TO-220AB, D ² PAK, I ² PAK	Total	1.95		
		TO-220FPAB	Total	5.05		
Russia	Coupling	TO-220AB, D ² PAK, I ² PAK		0.70		
Tyth(c) Coupling	R _{th(c)} Coupling TO-220FPAB	_	4.00	C/VV		

When the diodes 1 and 2 are used simultaneously:

 $\Delta T_{j \text{ (diode1)}} = P_{\text{(diode1)}} x R_{\text{th(j-c)}} \text{ (per diode)} + P_{\text{(diode2)}} x R_{\text{th(c)}}$

DS7078 - Rev 3 page 2/18

page 3/18



Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
. (1)	T _j = 25 °C	V - V	-	3.2	15	μA	
IR (")	I _R ⁽¹⁾ Reverse leakage current	T _j = 125 °C	$V_R = V_{RRM}$	-	2.8	8	mA
	V _F ⁽²⁾ Forward voltage drop	T _j = 25 °C	L = 40 A	-	0.815	0.880	
V (2)		T _j = 125 °C	I _F = 10 A	-	0.660	0.710	.,
VF (=)		T _j = 25 °C	L = 20 A	-	1.030	1.160	V
		T _j = 125 °C	I _F = 20 A	-	0.765	0.865	

^{1.} Pulse test: $t_p = 5$ ms, $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

$$P = 0.555 \times I_{F(AV)} + 0.0155 I_{F}^{2} (RMS)$$

^{2.} Pulse test: t_p = 380 μ s, δ < 2%



1.2 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current (per diode)

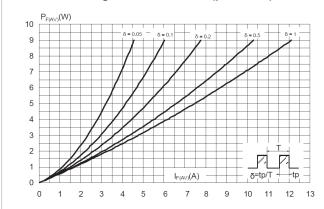


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

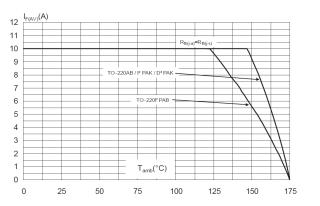


Figure 3. Normalized avalanche power derating versus pulse duration ($T_i = 125$ °C)

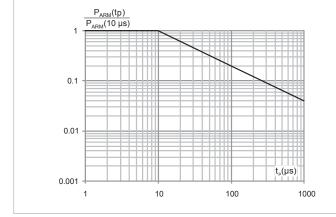


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK,I²PAK)

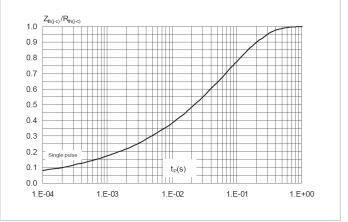


Figure 5. Relative thermal impedance junction to case versus pulse duration (TO-220FPAB)

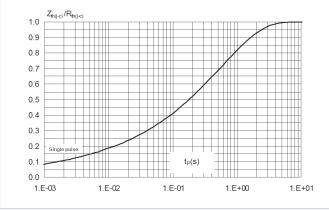
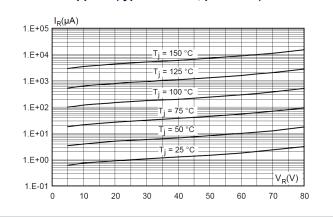


Figure 6. Reverse leakage current versus reverse voltage applied (typical values, per diode)



DS7078 - Rev 3 page 4/18



Figure 7. Junction capacitance versus reverse voltage applied (typical values, per diode)

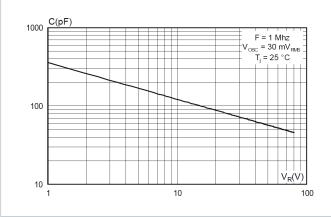


Figure 8. Forward voltage drop versus forward current (per diode)

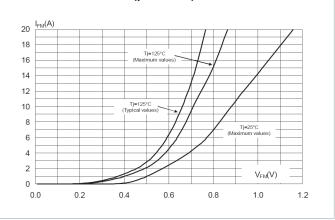


Figure 9. Reverse safe operating area

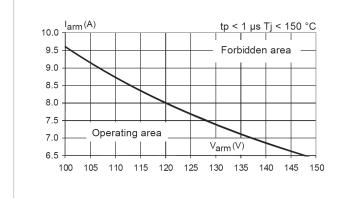
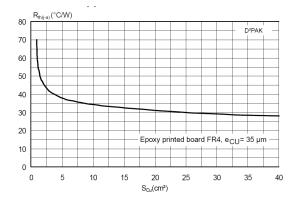


Figure 10. Thermal resistance junction to ambient versus copper surface under tab for D²PAK



DS7078 - Rev 3 page 5/18



2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

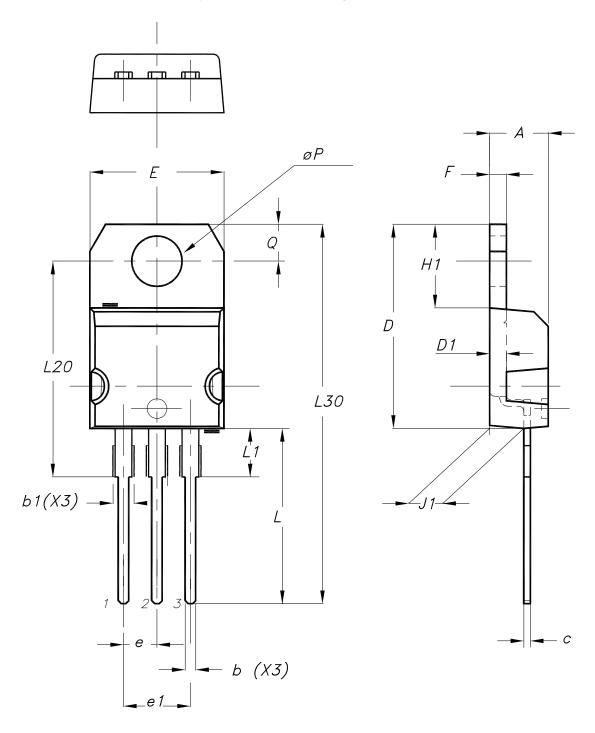
DS7078 - Rev 3 page 6/18



2.1 TO-220AB package information

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.7 N·m

Figure 11. TO-220AB package outline



DS7078 - Rev 3 page 7/18



Table 4. TO-220AB package mechanical data

	Dimensions				
Ref.	Millimeters		Incl	nes	
	Min.	Max.	Min.	Max.	
А	4.40	4.60	0.173	0.181	
b	0.61	0.88	0.240	0.035	
b1	1.14	1.55	0.045	0.061	
С	0.48	0.70	0.019	0.028	
D	15.25	15.75	0.600	0.620	
D1	1.27	typ.	0.050 typ.		
E	10.00	10.40	0.394	0.409	
е	2.40	2.70	0.094	0.106	
e1	4.95	5.15	0.195	0.203	
F	1.23	1.32	0.048	0.052	
H1	6.20	6.60	0.244	0.260	
J1	2.40	2.72	0.094	0.107	
L	13.00	14.00	0.512	0.551	
L1	3.50	3.93	0.138	0.155	
L20	16.40 typ.		0.646 typ.		
L30	28.90 typ.		1.138 typ.		
θР	3.75	3.85	0.148	0.152	
Q	2.65	2.95	0.104	0.116	



2.2 TO-220FPAB package information

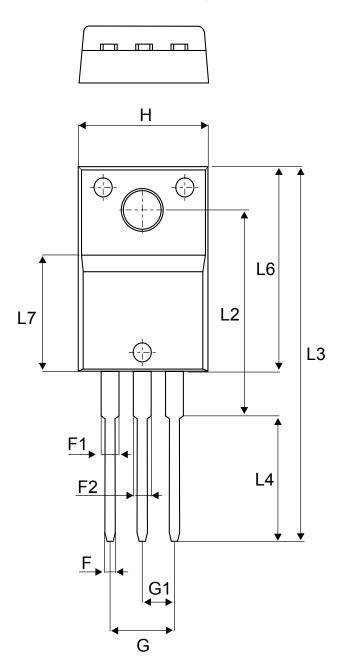
• Cooling method: by conduction (C)

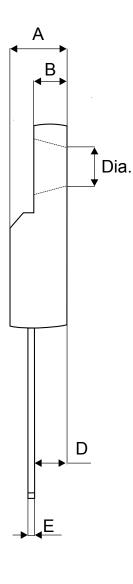
• Epoxy meets UL 94,V0

Recommended torque value: 0.55 N·m

• Maximum torque value: 0.7 N·m

Figure 12. TO-220FPAB package outline





page 9/18

D3/0/0 - Rev 3



Table 5. TO-220FPAB package mechanical data

			Dimensions	
Ref.	Millim	neters	Inches (for re	ference only)
	Min.	Max.	Min.	Max.
Α	4.40	4.60	0.1739	0.1818
В	2.5	2.7	0.0988	0.1067
D	2.50	2.75	0.0988	0.1087
Е	0.45	0.70	0.0178	0.0277
F	0.75	1.0	0.0296	0.0395
F1	1.15	1.70	0.0455	0.0672
F2	1.15	1.70	0.0455	0.0672
G	4.95	5.20	0.1957	0.2055
G1	2.40	2.70	0.0949	0.1067
Н	10.00	10.40	0.3953	0.4111
L2	16.00	typ.	0.632	4 typ.
L3	28.60	30.60	1.1304	1.2095
L4	9.80	10.6	0.3874	0.4190
L5	2.90	3.60	0.1146	0.1423
L6	15.90	16.40	0.6285	0.6482
L7	9.00	9.30	0.3557	0.3676
Dia	3.0	3.20	0.1186	0.1265

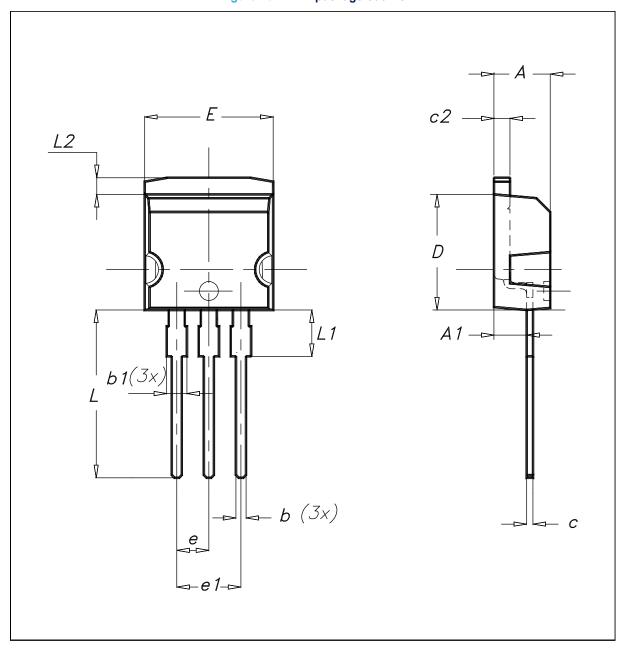
DS7078 - Rev 3 page 10/18



2.3 I²PAK package information

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0

Figure 13. I²PAK package outline



DS7078 - Rev 3 page 11/18



Table 6. I²PAK package mechanical data

		Dimensions					
Ref.	Millim	neters	Inc	hes			
	Min.	Max.	Min.	Max.			
Α	4.40	4.60	0.173	0.181			
A1	2.40	2.72	0.094	0.107			
b	0.61	0.88	0.024	0.035			
b1	1.14	1.70	0.044	0.067			
С	0.49	0.70	0.019	0.028			
c2	1.23	1.32	0.048	0.052			
D	8.95	9.35	0.352	0.368			
е	2.40	2.70	0.094	0.106			
e1	4.95	5.15	0.195	0.203			
E	10.00	10.40	0.394	0.409			
L	13.00	14.00	0.512	0.551			
L1	3.50	3.93	0.138	0.155			
L2	1.27	1.40	0.050	0.055			

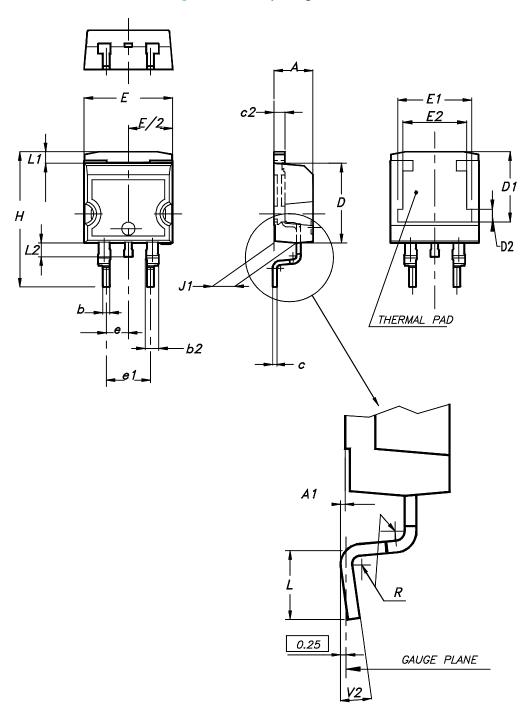
DS7078 - Rev 3 page 12/18



2.4 D²PAK package information

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0

Figure 14. D²PAK package outline



DS7078 - Rev 3 page 13/18



Table 7. D²PAK package mechanical data

	Dimensions				
Ref.	Millim	eters	Inch	ies	
	Min.	Max.	Min.	Max.	
А	4.36	4.60	0.172	0.181	
A1	0.00	0.25	0.000	0.010	
b	0.70	0.93	0.028	0.037	
b2	1.14	1.70	0.045	0.067	
С	0.38	0.69	0.015	0.027	
c2	1.19	1.36	0.047	0.053	
D	8.60	9.35	0.339	0.368	
D1	6.90	8.00	0.272	0.311	
D2	1.10	1.50	0.043	0.060	
E	10.00	10.55	0.394	0.415	
E1	8.10	8.90	0.319	0.346	
E2	6.85	7.25	0.266	0.282	
е	2.54	typ.	0.100		
e1	4.88	5.28	0.190	0.205	
Н	15.00	15.85	0.591	0.624	
J1	2.49	2.90	0.097	0.112	
L	1.90	2.79	0.075	0.110	
L1	1.27	1.65	0.049	0.065	
L2	1.30	1.78	0.050	0.070	
R	0.4	typ.	0.0	15	
V2	0°	8°	0°	8°	



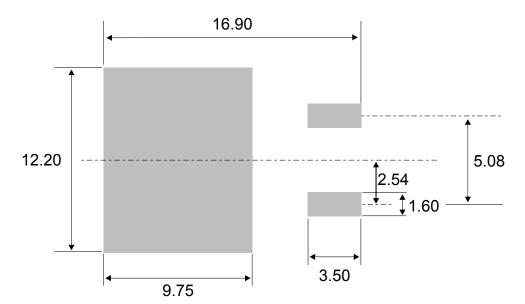


Figure 15. D²PAK Recommended footprint

Downloaded from Arrow.com.



3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS20LCD80CT	STPS20LCD80C	TO-220AB	1.95 g	50	Tube
STPS20LCD80CFP	STPS20LCD80C	TO-220FPAB	1.9 g	50	Tube
STPS20LCD80CR	STPS20LCD80C	I ² PAK	1.5 g	50	Tube
STPS20LCD80CG-TR	STPS20LCD80C	D ² PAK	1.38 g	1000	Tape and reel

DS7078 - Rev 3 page 16/18



Revision history

Table 9. Document revision history

Date	Revision	Changes
11-Jan-2011	1	First full version, consolidating the previous internal release of march 2013. Updated the DPAK package information.
29-Jul-2015	2	Updated features, and packages silhouette in cover page. Updated Section 2: "Characteristics" and Section 2.1:"Characteristics (curves)" Updated Section 3.2: "D²PAK package information.
10-Apr-2018	3	Updated I²PAK package information.

DS7078 - Rev 3 page 17/18



IMPORTANT NOTICE - PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2018 STMicroelectronics – All rights reserved

DS7078 - Rev 3 page 18/18